

TWO NEW SPECIES OF TERATEMBIIDAE (EMBIIDINA) FROM ARGENTINA

CLAUDIA A. SZUMIK

Department of Entomology, Comstock Hall, Cornell University,
Ithaca, New York 14853-0999

Abstract.—Both sexes of two new species of TeratembIIDae from Argentina, are described and illustrated. *Oligembia mini*, n. sp. is closest to *Oligembia bicolor* Ross, 1944. *Diradius erba*, n. sp. is closest to *Oligembia unicolor* Ross, 1944 (which seems to belong to *Diradius*).

Embiidina is a group well defined by a series of morphological and behavioral characters (Ross, 1970; Hennig, 1981). Most of the characters considered important for species recognition in this group refer to male characters, mainly terminalia, coloration, form and size of eyes, wing venation, and size and number of papillae on the hind basitarsus. The only female characters mentioned in the literature to distinguish species are total length, coloration, and number of papillae on the hind basitarsus (Ross, 1944, 1970). However, the hind basitarsus chaetotaxy, and the form and position of papillae in females (previously illustrated for males of some species, in papers by Krauss, 1911; Davis, 1939a, b, 1940a, b, 1942; Ross, 1957, 1971) also present specific differences; in the description of two species of TeratembIIDae from Argentina, those characters are used for the first time in females. These characters are also used in the males of the two new species and also in those of *O. unicolor* and *O. bicolor*.

MATERIALS AND METHODS

All measurements are given in millimeters. Ocular ratio is defined as the ratio between minimum distance between inner edges of eyes, and maximum distance of outer edges, in dorsal view.

The material examined is deposited in the Museo Argentino de Ciencias Naturales Bernardino Rivadavia (MACN) and in the Facultad de Ciencias Exactas y Naturales de la Universidad de Buenos Aires (FCEN).

Abbreviations used follow Ross (1944 and subsequent papers): 9T, ninth abdominal tergite; 10T, tenth abdominal tergite; 10L, left hemitergite of tenth abdominal tergite; 10R, right hemitergite of tenth abdominal tergite; MS, medial sclerite of tenth abdominal tergite; 10LP, process of left hemitergite; 10RP, process of right hemitergite; EP, epiproct; LPPT, left paraproct; RPPT, right paraproct; H, hypandrium or ninth abdominal sternite; HP, process of ninth sternite; LCB, left cercus-basipodite; RCB, right cercus-basipodite; LCBP, process of left cercus-basipodite.

Descriptions are based on only one specimen; variation observed on other specimens is pointed out separately, with the mean value followed by standard deviation and range, in parentheses; for proportions, only the range is given.

Setae are omitted in the drawings of terminalia.

Genus *Diradius* Friederichs, 1934

According to Ross (1984b:45) this genus differs from *Oligembia* Davis by the following characters of the male terminalia: 1—“. . . complete absence of fusion lines between 10L, 10R and medial sclerite (MS) . . .” 2—“. . . outer side of the right hemitergite (10R) . . . at least as long as outer margin of 10L . . .” 3—“. . . usual presence of lobe beneath the “claw”-bearing lobe of the left cercus-basipodite . . .”

The only character that really distinguishes *Diradius* from *Oligembia* (and all the embidiina) is the last one, previously mentioned by Ross (1944:476) as “LCB with two inner lobes, the ventral one usually shorter and broadly pointed, the upper lobe elongate with a terminal cleft forming rather long “claws” which may at times be fused together . . .”

Species transferred by Ross (1984a:90) to the genus *Diradius* lack the former two characters mentioned. *Diradius lobatus* (Ross, 1944: fig. 128); *Diradius excissa* (Ross, 1944: fig. 139); *Diradius plaumanni* (Ross, 1944: fig. 143); *Diradius vandikei* (Ross, 1944: fig. 152); *Diradius nigrina* (Ross, 1944: fig. 149), have a “fusion line” between 10L and MS. Although some species of *Diradius* differ from *Oligembia* in this character, the same is not true for all the species in the genus.

The situation is similar with regard to the outer margin of the 10R. *Diradius chiapae* (Ross, 1944: fig. 137), *D. excissa* (Ross, 1944: fig. 140) and *D. nigrina* (Ross, 1944: fig. 150), have the outer margin of the 10R slightly shorter than the outer margin of the 10L, and species as *D. plaumanni* (Ross, 1944: fig. 143), *D. gigantea* (Ross, 1944: fig. 146), *D. vandykei* (Ross, 1944: fig. 152) and *D. caribbeana* (Ross, 1944: fig. 155), have the outer margin of the 10R clearly shorter than that of the 10L.

***Diradius erba*, new species**

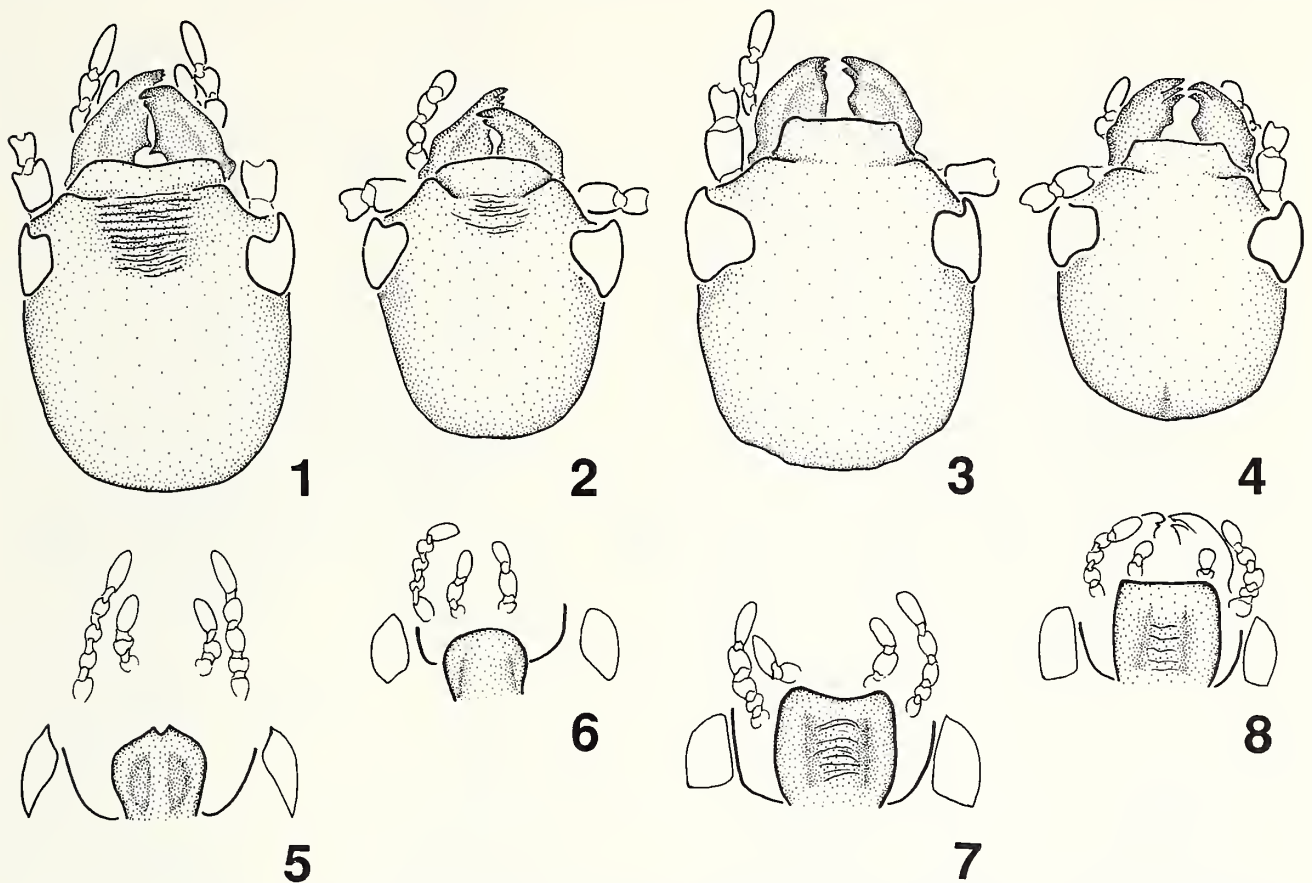
(Figs. 1, 5, 9, 11, 17, 18, 21, 23, 29)

Diagnosis. *Diradius erba* is closest to *Oligembia unicolor* Ross, 1944. *Diradius erba* has the apex of LCBP with lateral margins convergent and straight, with two blunt apical spines, the anterior margin of the submentum with two triangular mesial projections, the margin of 10L, 10R and MS with depressions towards the base of 10RP, marked by deep lines. *Oligembia unicolor*, instead, has the apex of LCBP with lateral margins irregular and divergent, forming a circular plate with two projecting spines, the anterior margin of submentum rounded, and the margin of 10L, 10R and MS without depressions.

Types. Holotype male (in alcohol) from Argentina, Entre Rios Prov., Balneario La Lana, 5 6 XII 1987, C. Szumik, P. Goloboff col. (MACN) Paratypes: three males, same data as the holotype (MACN); male and female from Argentina: Buenos Aires Prov., Otamendi, INTA Delta, 14 15 XII 1988, C. Szumik, A. Valverde col. (MACN).

Etymology. The specific name is formed with the initials of the provinces where the species has been collected.

Male holotype. Total length: 4.90. Head (Fig. 1): rectangular, width/length, 0.68. Eyes very small, ocular ratio: 0.74. Mandibles (Fig. 1): left with three very short, inconspicuous teeth in the tip; inner margins with a very sharp and conspicuous basal tooth. Submentum: anterior margin with two short triangular projections and a small notch between them (Fig. 5). Wing lengths: anterior, 3.40; posterior, 2.75. Wing venation similar to the venation illustrated by Mariño and Marquez (1982:



Figs. 1–8. Males. 1–4. Head, dorsal, 5–8. Submentum. 1, 5. *Diradius erba*. 2, 6. *Oligembia unicolor*. 3, 7. *O. mini*. 4, 8. *O. bicolor*.

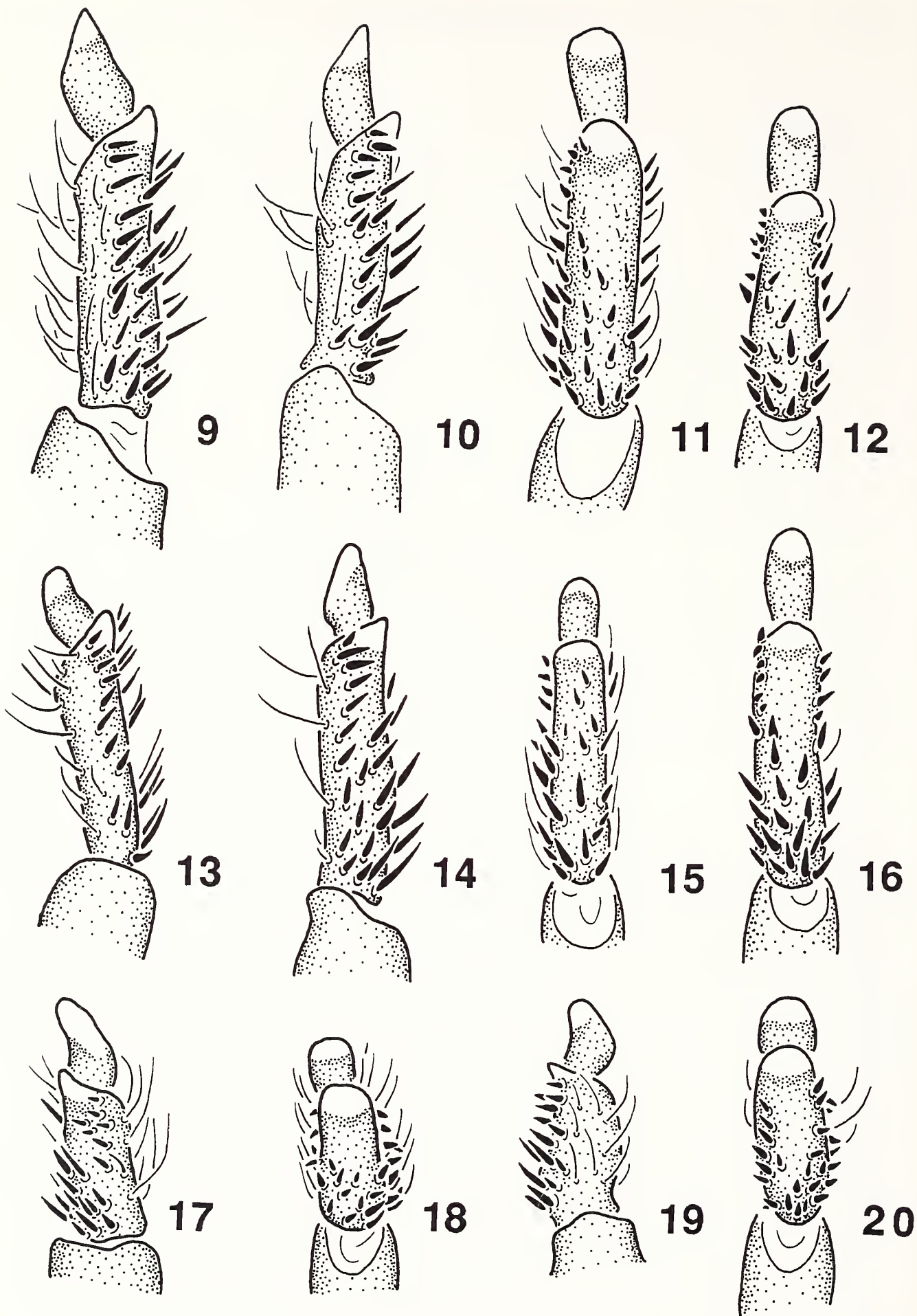
Figs. 12, 13) for *Diradius cristobalensis*: Ma, Ma1, Ma2, Mp, Cua y A inconspicuous, marked by rows of macrotrichia; Ma forked, the rest unforked. Cross veins: anterior wing: 3 or 5 between C and R1, 3 between R1 and Rs; posterior wing: 3 or 5 between C and R1, 4 to 5 between R1 and Rs.

Hind leg: total length, 1.74. Hind basitarsus, length: 0.19, width/length: 0.28; setae as in Figures 9, 11.

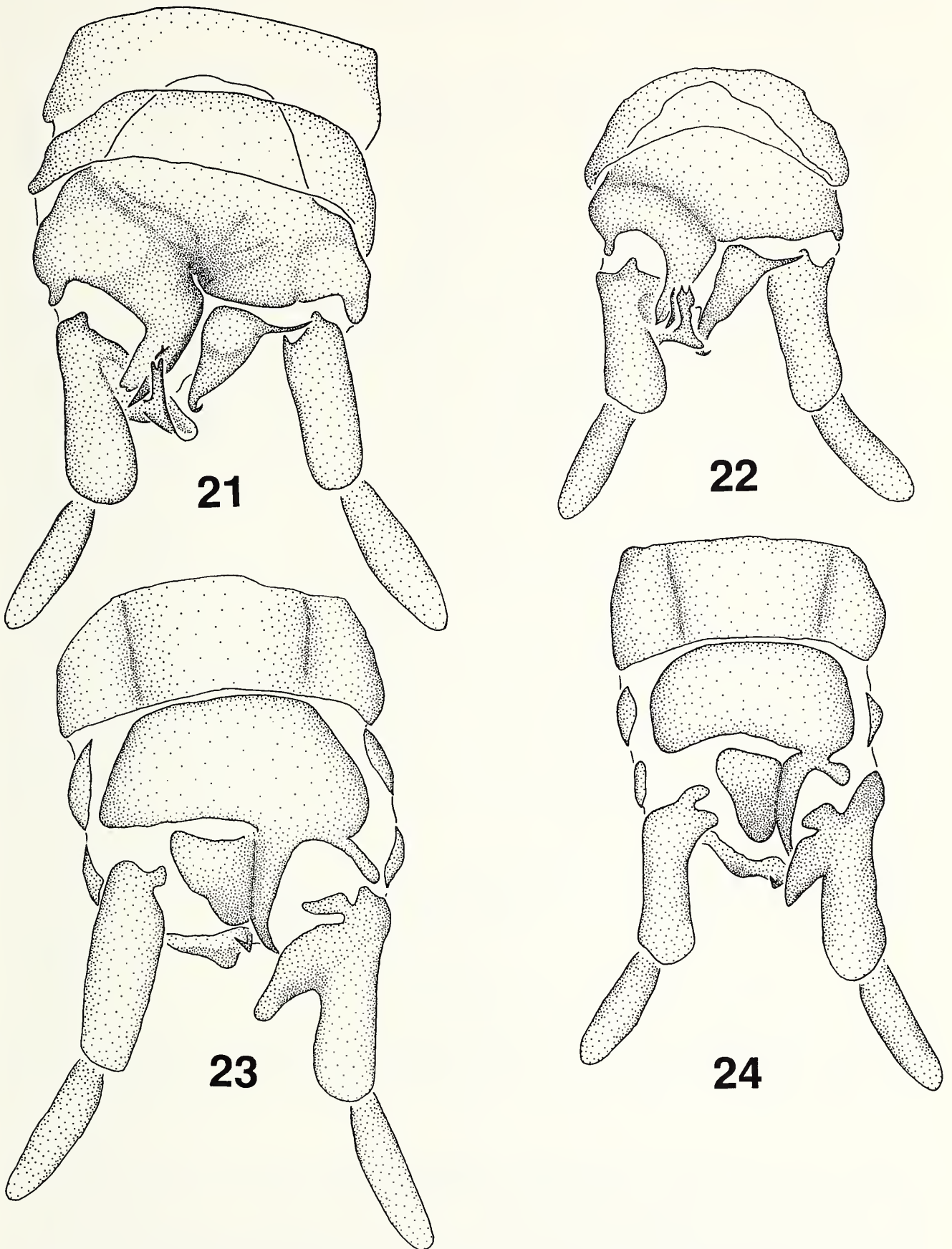
Head black-brown, labrum yellowish white, maxillary and mandibular palpi, mandibles, and eyes brown; 1st and 2nd antennal segments black-brown, 3rd to 5th yellowish, 6th to 8th slightly tan, the rest brown. Thorax brown, joints of sclerites and wings orangish tan. Tarsi of mid and hind legs yellowish, the rest brown. Abdomen: segments 9 and 10 brown, second segment of cerci with yellowish apex, the rest orangish tan.

Terminalia: Figures 21, 23, 29. MS extending to the anterior margin of the 9T. Fusion lines present between MS and 10L, and between MS and 10R, the latter shallow and inconspicuous; MS and 10R depressed towards the base of 10RP, with very conspicuous ridges. LPPT partially fused to the H, with anterior end blunt and posterior end sharp, the latter extending dorsally. LCB differentiated from the rest of the segment by being more pigmented and sclerotized.

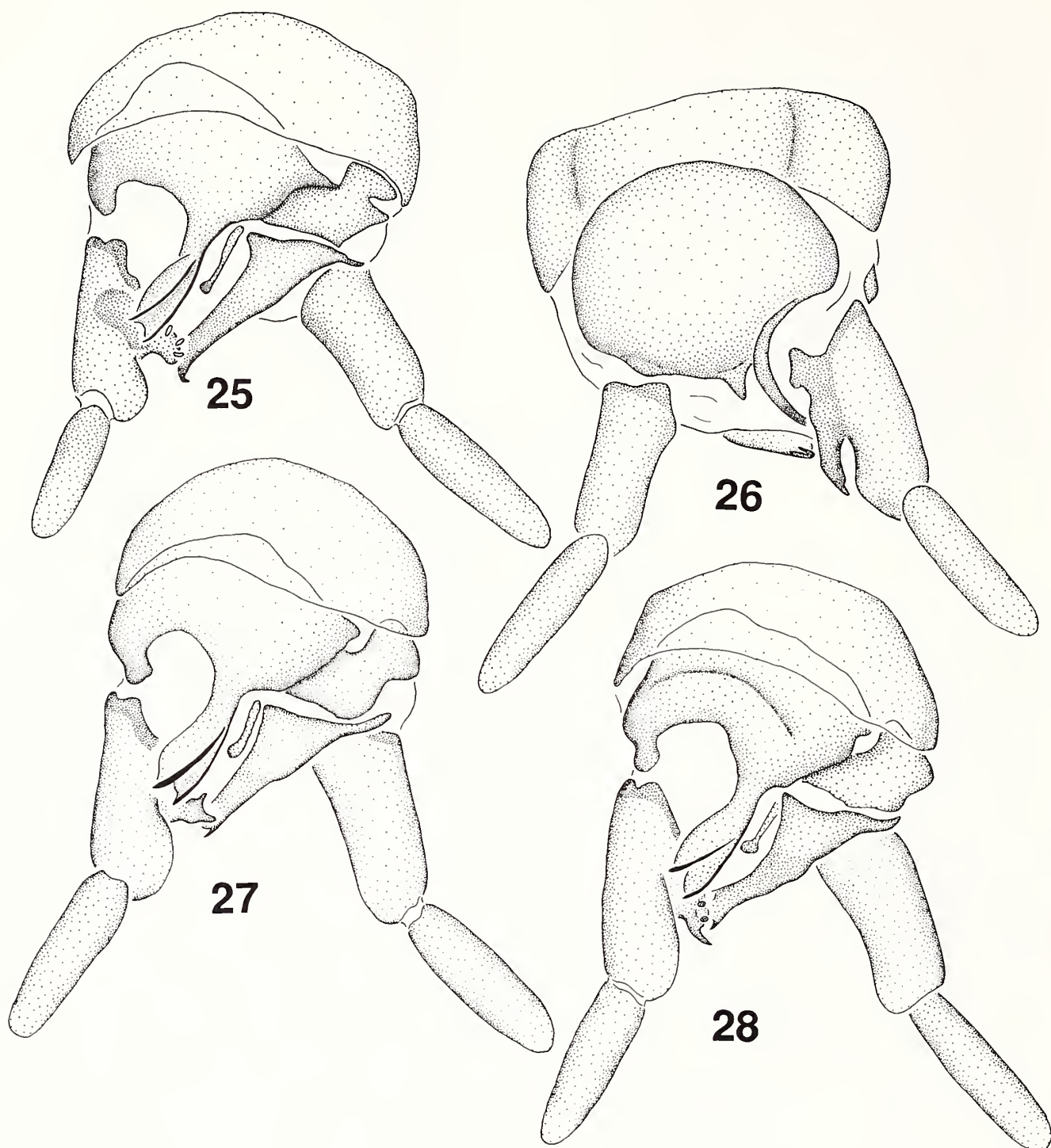
Variation. Total length, 4.51 (± 0.37 , 4.00–5.00, N = 8). Head, width/length ratio varies between 0.65 and 0.72. Ocular ratio: 0.62–0.74. Wing length: anterior, 3.40 (± 0.13 , 3.20–3.60); posterior, 2.66 (± 0.08 , 2.50–2.75). Cross veins: anterior wing, 3 to 9 between C and R1, 2 to 6 between R1 and Rs; posterior wing, 2 to 7 between



Figs. 9-20. Chaetotaxy. 9-16. Left hind basitarsus of male. 17-20. Right hind basitarsus of female. 9, 11, 17, 18. *D. erba*. 9, 17. Anterior. 11, 18. Ventral. 10, 12. *O. unicolor*. 10. Anterior. 11. Ventral. 13, 15, 19, 20. *O. mini*. 13, 19. Anterior. 15, 20. Ventral. 14, 16. *D. bicolor*. 14. Anterior. 16. Ventral.



Figs. 21–24. Terminalia of male. 21, 22. Dorsal. 23, 24. Ventral. 21, 23. *D. erba*. 22, 24. *O. unicolor*.



Figs. 25–28. Terminalia of male. 25, 27, 28. Dorsal. 26. Ventral. 25, 26. *O. mini*. 27, 28. *O. bicolor*.

C and R1, 3 to 5 between R1 and Rs. Rs of left anterior wing is forked in one of the paratypes from the topotypic locality.

Posterior leg: total length, 1.73 (± 0.08 , 1.60–1.91); basitarsus, length: 0.20 (± 0.01 , 0.19–0.23), width/length: 0.24–0.32.

A male from Chascomús has the 1st and 2nd antennal segments black-brown, 3rd to 6th yellowish, the rest brown.

Female paratype. Total length: 4.45. Head: width/length, 0.79. Ocular ratio: 0.82. Hind leg: total length, 1.50; basitarsus, length: 0.13, width/length: 0.49. Hind basitarsus: anterior face, apical half with 4 to 6 short macrosetae directed toward the

base of the article (Fig. 17); ventral face with macrosetae only on its basal half (Fig. 18).

Head, maxillary and mandibular palpi, mandibles and antennae brown. Prothorax and mesothorax brown, metathorax tan. Legs: mid and hind tarsi slightly tan, the rest brown. Abdomen: 8th, 9th and 10th segments and basal segment of cercus brown, the rest tan.

Variation. No significant differences were observed in the only other adult female examined.

Biology. The specimens were collected on "Espinillo" (*Acacia caven*, Leguminosae) and *Eucalyptus* sp. The nests were found under bark, with very short portions of the galleries uncovered. Four nests were observed, one with an adult female, another with an adult male, and two with groups of juveniles.

Discussion. Additional differences with *Oligembia unicolor* (observations made on a male from the topotypic locality, Nova Teutonia, Brazil, Ross col., E. S. Ross det. 1990) are: left mandible with three short and conspicuous teeth (Fig. 2); inner basal margins of both mandibles with rounded (instead of sharp) teeth (Fig. 2); submentum: anterior margin convex (Fig. 6); outer and inner processes of 10LP of the same length; 10T reaching the middle of 9T (Fig. 22); anterior margin of LPP fused only a short distance to the H; anterior edge of LPP rounded, posterior tip sharp; H rectangular (Fig. 24). With regard to the hind basitarsus chaetotaxy (Figs. 10, 12), no significant differences with *D. erba* were observed.

Some of the characters mentioned above do not coincided with the description of the holotype of *Oligembia unicolor* by Ross (1944:471, figs. 115–117). The H is described there as having "each corner produced as a narrow, truncate projection." The LCBP is described (p. 470) as an "... inner projection sclerotic, with a dorsal pair of short serrations" (in the topotype the LCBP (see Figs. 22, 30) arises ventrally and laterally, shaped as a lamina, and subapically on this a second process—mentioned above—is set).

It seems evident, on the light of the above comments, that *O. unicolor* belongs to *Diradius*. However, no new combination is formally proposed here, on the assumption that E. S. Ross in his intended revision of the Embiidina, will discuss the systematic position of this species.

Distribution. Argentina: Provinces of Buenos Aires and Entre Rios.

Other material examined. Argentina: Entre Rios prov.: El Palmar, 11 IX 1985, Maloné col., male (FCEN); Balneario La Lana, 5 6 XII 1987, C. Szumik, P. Goloboff col., 2 juvenile males (MACN); Buenos Aires prov.: Otamendi, INTA Delta, 2 VII 1969, male (FCEN); Chascomús, V 1989, S. Mazzucconi col., male and female (MACN).

Genus *Oligembia* Davis, 1939

According to Ross (1984b:43) the males of *Oligembia* Davis would differ from those of *Diradius* Friederichs by the following characters of the terminalia: 1—"... lines of fusion of 10L, 10R and MS still evident as shallow indistinct grooves ..."; 2—"10R with outer side short ... (in ..."; 3—"10LP with inner and outer processes subequal," and 4—"LCB has only a single inner process terminated by minute bifurcation."

Contrary to Ross' statements, the only character that distinguishes all species of

this genus from *Diradius* (and other Teratemiidae) is the 10LP with subequal inner and outer portions. However, this is a plesiomorphic state and no apomorphy supporting the monophyly of *Oligembia* is known. The other characters that Ross mentions for *Oligembia* are also found in some species of Teratemiidae that do not belong to *Oligembia* (for example see comments under *Diradius*; these characters thus appear to be apomorphies at higher levels than this genus.

***Oligembia mini*, new species**
(Figs. 3, 7, 13, 15, 19, 20, 25, 26, 31)

Diagnosis. *O. mini* is closest to *O. bicolor* Ross, 1944, but it can be distinguished by having the apex of the LCBP with three sharp apical points instead of two (a third point found in some males of *O. bicolor* is situated in the middle of the process).

Types. Holotype male (in alcohol, terminalia treated with alcali) from Argentina, Misiones Prov., Parque Nacional Iguazú, area cataratas, 31 I 1988, C. Szumik, P. Goloboff col. (MACN); Paratypes: male (hind pair of legs missing, wings in bad condition) and female, with same data as the holotype (MACN).

Etymology. The specific name refers to the size of the specimens (from the guaraní, *mini* = small).

Male holotype. Total length: 3.95. Head (Fig. 3): width/length, 0.73; Mandible: with very short teeth (Fig. 3); Submentum: anterior margin strongly concave (Fig. 7). Eyes quadrangular, ocular ratio: 0.65. Wing length: anterior, 2.85; posterior, 2.05. Wing venation similar to the venation illustrated by Davis (1939a: Fig. 2) for *Oligembia hubbardi*: R1, Cu1b and A conspicuous, the rest marked by rows of macrotrichia; Ma forked, the rest unforked; cross veins: anterior wing: 4 or 6 between C and R1, 2 between R1 and Rs; posterior wing: 5 between C and R1, 4 between R1 and Rs.

Hind leg: total length, 1.59. Hind basitarsus, length: 0.20, width/length: 0.25, disposition of setae in Figures 13, 15.

Head brown, labrum, maxillary and mandibular palpi and eyes slightly tan; antennae: 2nd segment yellowish, the rest slightly tan. Prothorax yellowish, mesothorax and metathorax slightly tan. Legs: coxa and trochanter of the three pairs and tibia and tarsus of the mid pair yellowish, the rest brown. Abdomen: 10th segment brown, and apex of 2nd segment of the cerci yellowish; the rest slightly tan.

Terminalia: Figures 25, 26, 31. 10R separated from MS by irregular membranous band. 10R with irregular margin, not extended towards the 9T. Apex of 10RP extended towards the right side. Posterior margin of the 10L slightly curved toward anterior margin; fusion line present between 10L and MS. H semicircular; HP triangular without transverse lines. LCBP with base ventral and inner, extended dorsally, with three sharp points in the apex, no more sclerotized than the rest of the LCBP.

Female paratype. Total length: 4.65. Head: width/length, 0.77. Ocular ratio: 0.83. Hind legs: total length, 1.21; hind basitarsus, length: 0.13, width/length: 0.45. Setae as in Figures 19–20.

Head orangish tan, eyes black, labrum yellow white, maxillary and mandibular palpi and 11th basal antennal segments slightly tan, 12th antennal segment yellow white. Prothorax and joints between thoracic sclerites yellow white, mesothorax and metathorax slightly tan. Legs: coxa and trochanter of the three pairs, and tibia and



Figs. 29–33. Process of left cercus-basipodite. 29. *D. erba*. 30. *O. unicolor*. 31. *O. mini*. 32, 33. *O. bicolor*.

tarsus of the hind pair yellow white, the rest slightly tan. Abdomen slightly tan, joints among segments yellow white; 1st segment of cercus yellow white, 2nd segment yellowish white. Apical segment of the cercus short and conical.

Variation. Aside from the specimens described, only one adult male and one adult female were examined; no significant variation was observed on these specimens.

Biology. The specimens were collected in nests between mosses growing on stones and roots of the banks of the Iguazú river; the tubes deepened 1 to 2 cm beneath the surface. The environment was very humid. Two nests were observed; both with an adult female and juveniles, one also with an adult male. The other male examined was collected as a juvenile and matured in captivity (in February).

Discussion. Four topotypic males of *Oligembia bicolor* (from Brazil, Nova Teutonia, matured 31 III 1965, Ross. col., E. S. Ross det. 1990) show the following additional differences with *O. mini*: apical mandibular teeth conspicuous (Fig. 4); anterior margin of the submentum slightly concave (Fig. 8); 10R with a more regular margin, apex of 10RP extended towards the left (Figs. 27, 28); HP with many transverse lines; LCBP (Figs. 28, 33) with two points in the apex, and another one in the middle of the process (one of the four specimens, Figures 27 and 32, lacks the latter point).

No significant differences with *O. mini* were observed in the disposition of setae in the hind basitarsus of *O. bicolor* (Figs. 14–16).

In the original description of *O. bicolor* (Ross, 1944:469, Figs. 108–110) the LCBP is described as a “conical lobe with two projections,” and the third projection in the middle of the process (observed in three of the four topotypic specimens) is not mentioned.

Distribution. Known only from the type locality.

Other material examined. One adult female, six juvenile females and seven juvenile males, with same data as the holotype (MACN).

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